Swanson, Greg

From: Swanson, Greg
Sent: Friday, August 09, 2002 9:32 AM
To: Aggarwal, Pravin
Cc: Oliver, Stan
Subject: RE: SRB APU Fuel pump inlet port cracking

Pravin,

The SRB project is pursuing a risk assessment rationale for the APU fuel pump inlet port cracking issue for the next 3 flights since the hardware has already been integrated. For flights beyond the next three there may be changes in the processing so that NDE inspections with quantifiable POD's are included along with other controls of the fracture critical elements. There are other components in the SRB system that are processed in a similar fashion to the APU fuel pump and I think there should be an assessment of them also (I hear that USA may have already started this task), some insight into the scope of the hardware possibly affected, and the short and long term plans to deal with the hardware.

Greg

-----Original Message-----
From: Aggarwal, Pravin
Sent: Thursday, August 01, 2002 8:53 AM
To: McConnaughey, Paul; Finnegan, Charles; Swanson, Greg; Oliver, Stan; Oliver, Rebecca; Meyers, Charles; Meyer, Rae; Rowe, Sidney
Subject: SRB APU Fuel pump inlet port cracking

As you all may know we have another serious flight issue related to SRB APU fuel pump inlet port cracking which is being worked for last two weeks along with Flow liner cracking. Leak from this port is characterized as Crit 1. Following is an update related to this issue. Stan Oliver is the primary point of contact for stress on this issue.

SRB office is briefing the status to Mr. Dittmore this morning.

Mike Murphy from SRB office visited us yesterday discussing the issue related to APU Fuel Pump Inlet port cracking. Their current flight rationale basically says no issue as of today in so many launches and visual O.D inspection of available units identified no crack. OV-104 units have not been inspected in the VAB yet. Crack fractography shows 0.2x0.3 inch corrosion area and associated overload thru crack region. Material is sand cast Al 355 which is basically not a ductile material. Major loading, yield level stresses, is introduced via torque.

We have suggested them a potential approach which basically says:
-Inspect units via x-ray/eddy current to screen the original manufacturing level.
-Visual inspect closely to assure no corrosion (post removal of paint, grease etc.)
-Leak check post torque
-Notch material testing
-Develop empirical database, history of flights, torque cycles, inspection intervals between flights
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It is our opinion that this approach will result in assuring that there is no thru crack. In addition, stresses post torque of bolts due to hotfire condition are less than 0.5 ksi i.e., not sufficient to make an undetectable crack a thru crack.

Appropriate material properties (not available today) based anchored analysis may support the flight rationale in conjunction with positive leak check, post installation of the Rosen fitting.

In addition, we have recommended to address other similar ports in the pump and develop a rationale for not inspecting.

Pravin Aggarwal
ED22